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PCT/GB 2003 / 001162



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REC'D 22 MAY 2003

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## PRIORITY DOCUMENT

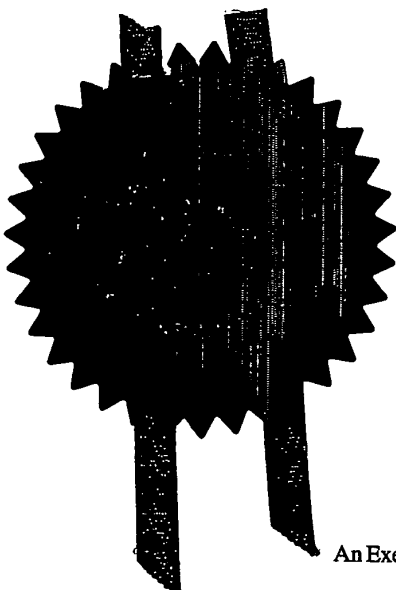
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Dated 2 April 2003

18. MAR. 2002 16:01

HARRISON GODDARD FOOT

NO. 219 P. 44

Patents Form 1/77

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Patent  
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Cardiff Road  
Newport  
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NP9 1RE

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MRH/P100046

2. Patent application number

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0206338.6

15MAR02 E704430-1 002973

P01/7700 0.00-0206338.6

18 MAR 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

AES ENGINEERING LTD  
Mill Close  
Bradmarsh Business Park  
ROTHERHAM  
S60 1BZ

Patents ADP number (if you know it)

8106932001

If the applicant is a corporate body, give the country/state of its incorporation

UK

4. Title of the invention

Product Selection

5. Name of your agent (if you have one)

Harrison Goddard Foot

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Belgrave Hall  
Belgrave Street  
Leeds  
LS2 8DD

Patents ADP number (if you know it)

14571001-7631310002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if

- a) any applicant named in part 3 is not an inventor, or Yes
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.
- See note (d))

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Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

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11.

I/We request the grant of a patent on the basis of this application.

Signature

Date

18 March 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Michael Harrison

0113 233 0100

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1/511

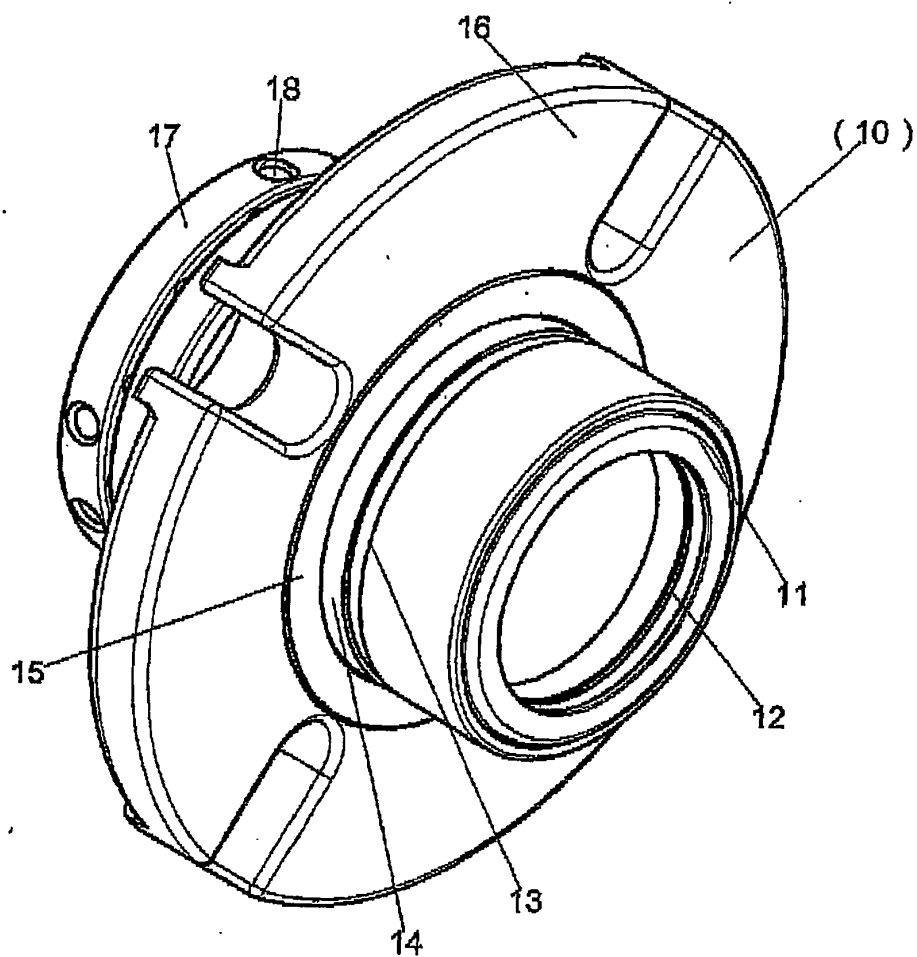


Fig. 1

2/8/11

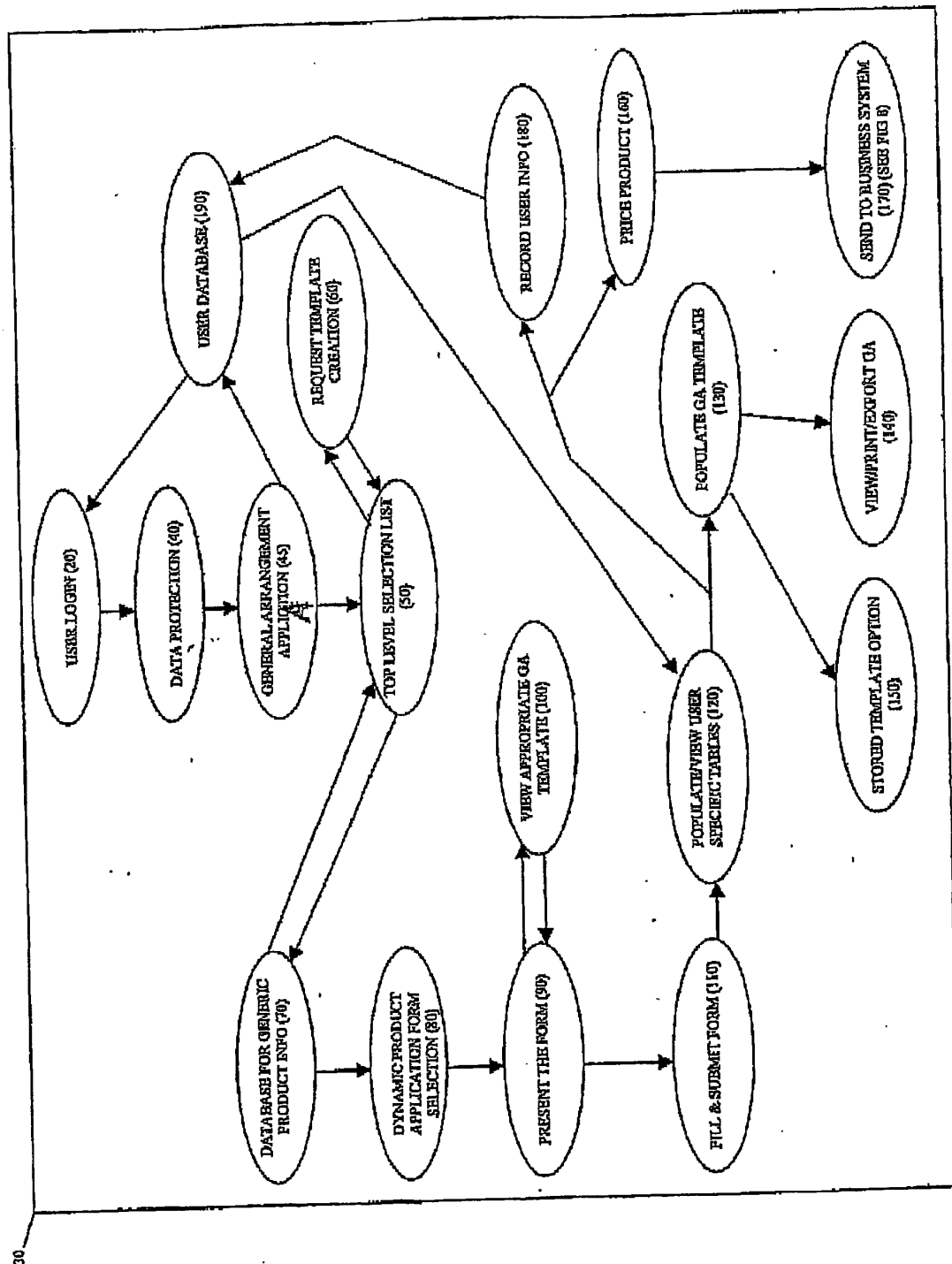


Fig. 2

31511

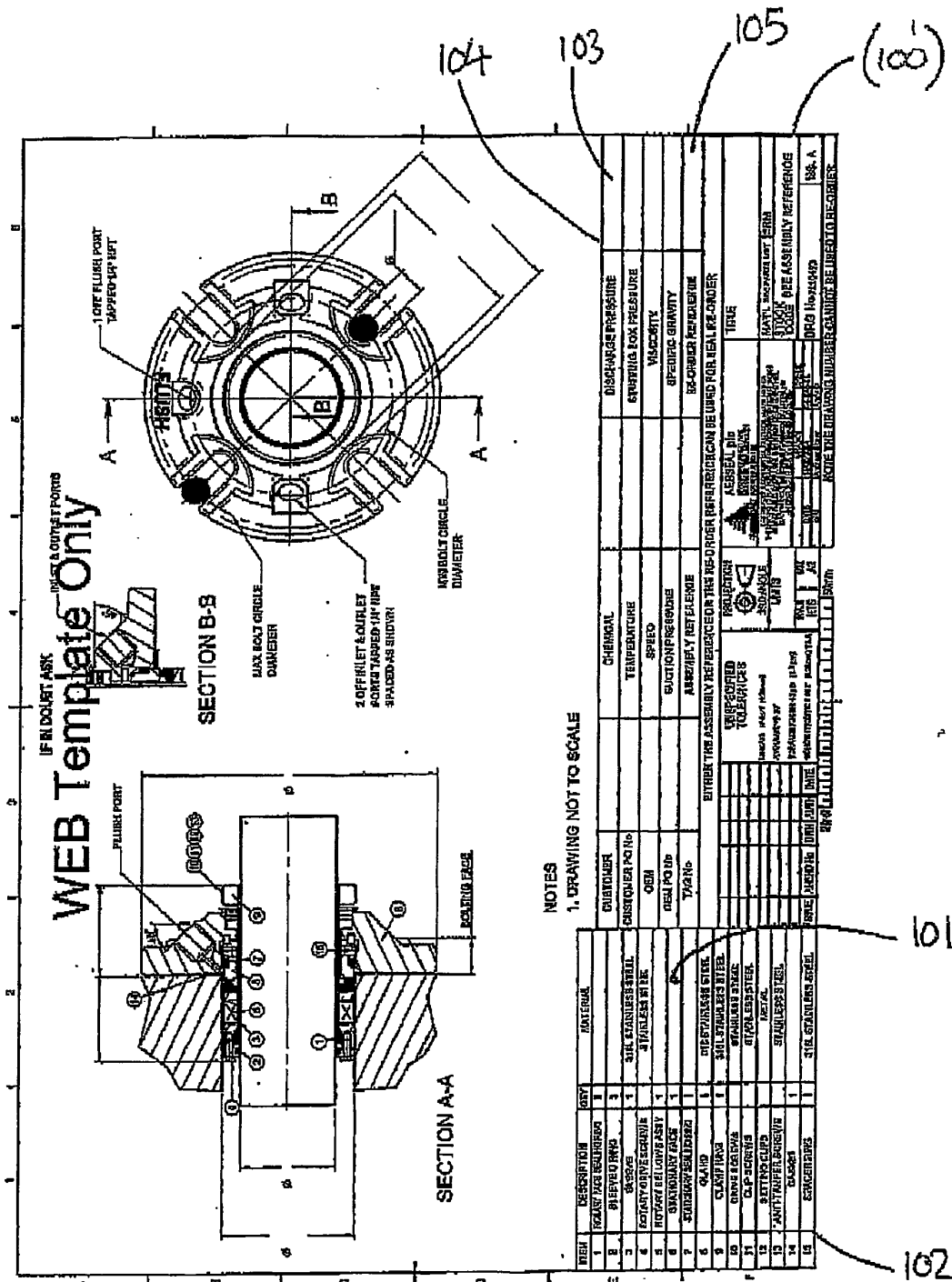
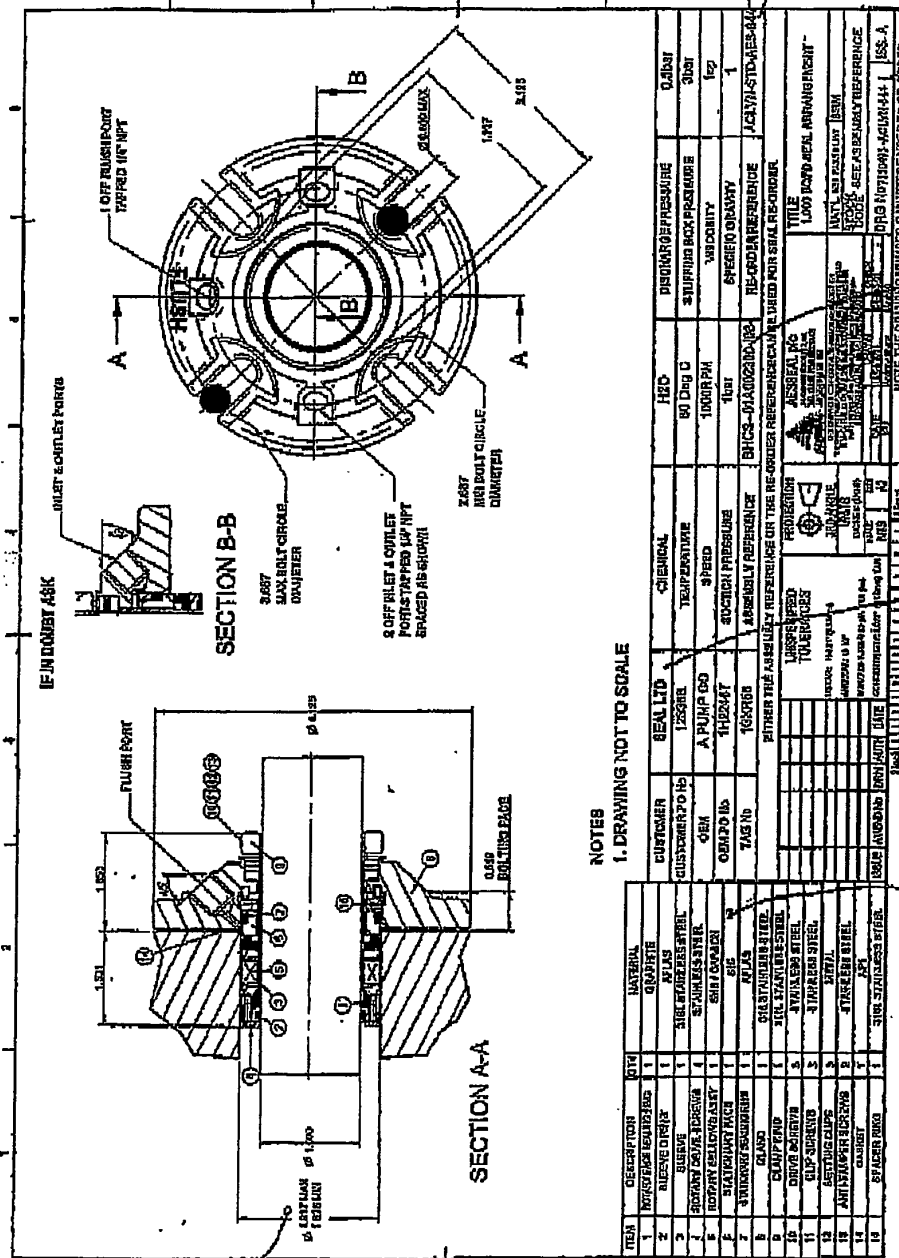


FIGURE 3

4/51



- 109 -

107

106

112

FIG 4

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5/11

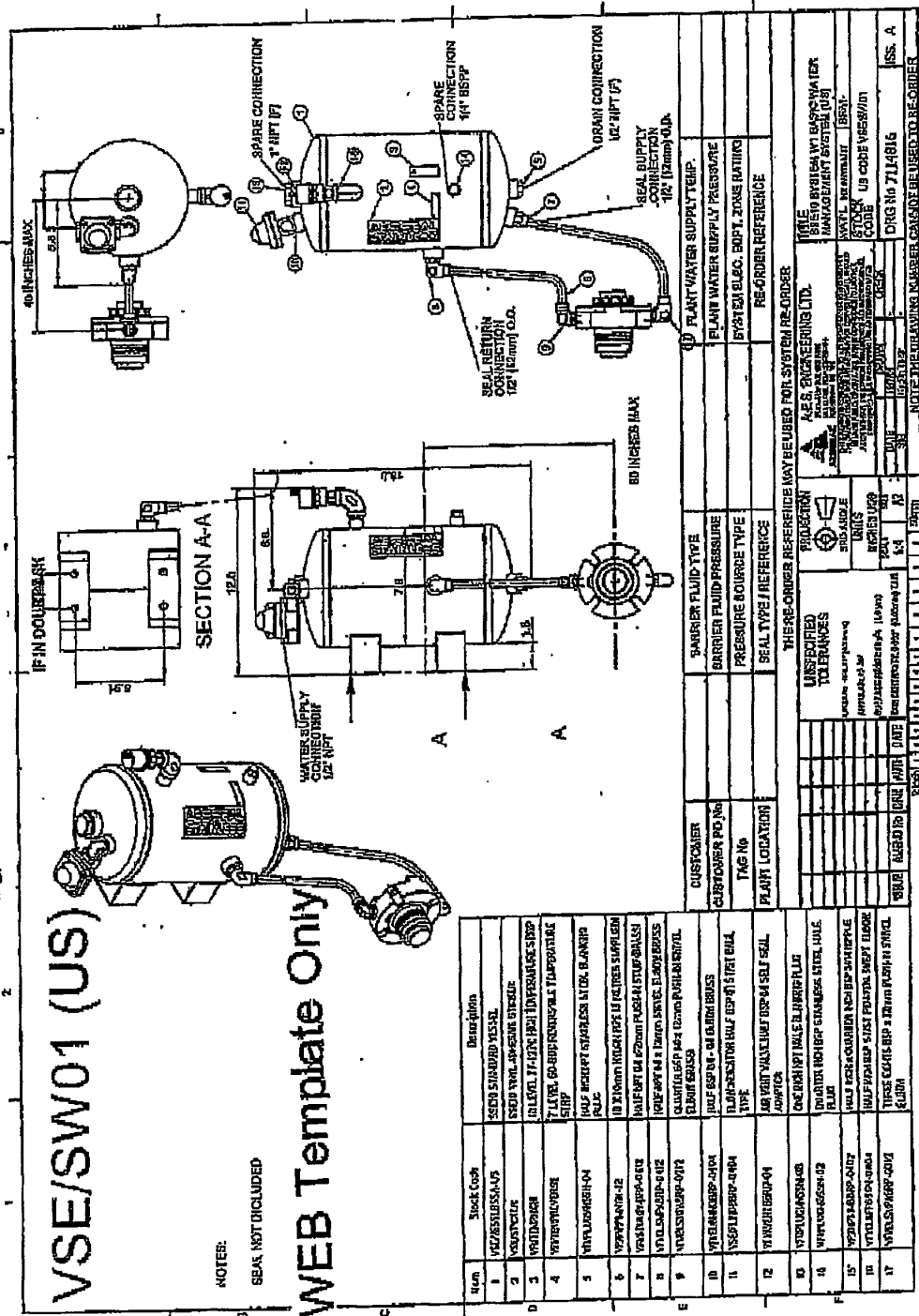


FIG 5



18. MAR. 2002 15:59

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FIGURE 6

6/11

Date = 06/02/02 1:46:00

# Assembly File Maintenance

assembly code : R9 BHCS  
Description : 1.000 BQFD  
Alpha code : BQFD 1.000  
Units : EACH  
Phantom? : N  
Drawing number :  
Revision number : 0001  
Date : 06/02/02

\*\*\*\*\*  
\*  
\*  
\*  
\*  
\*\*\*\*\*

## Seq Component code

001 R1 2SX0823/01  
002 R1  
003 R1  
004 R1 2SX0821  
005 R1  
006 R1  
007 R1 SP0807-25/01  
008 R1 SB0808-25/01  
009 R1 SB0810/01  
010 R2 YSKS03  
011 R2  
012 R2 YSKS08  
013 R2 YCUR02  
014 R2 YSKS05-N  
015 R2 YSKS237

## Description

AES BCURC 1.000 SLVE O RING / GRAPHITE  
BCURC 1.000 BELLOWS GRAPHOIL DRIVE END  
CSM 25 MM SPACER RING  
CURC 25 MM GLAND  
CURC 1.000 CLAMP RING  
M6x8 SOCKET SET SCREWS (A4)  
M6 x 8 A4 S/STEEL ANTI TAMPER  
CURC CLIPS (ZINC)  
M6x8 CURC CAP HEAD SCREWS  
M3 x 8 HEX HEAD SCREW (A4)

Qty	Dtg	Ref
1	03	
1	02	
1	05	
1	01	
1	06	
1	07	
1	15	
1	08	
1	09	
3	10	
1	14	
2	13	
3	12	
3	11	
4	04	

## WEB BILL OF MATERIAL TEMPLATE

18. MAR. 2002 10:00

HARRISON GODDARD FOO

NO. 279 P. 39

FIGURE 7

Assembly File Maintenance

Date : 06/02/02 1:46:00

(210)

```

Assembly code : R9 BHCS--01A002300-108-
Description   : 1.000 BQFD CB/SIC (SHS) -AZ/GR/AZ.
Alpha code    : BQFD 1.000
Units         : EACH
Phantom?      : N
Drawing number :
Revision number : 0001
Date          : 06/02/02
  
```

Seq	Component code	Description	Qty	Dwg Ref
001	R1 2SX0823/01	ARS BCURC 1.000 SLVE O RING / GRAPHITE	1	03
002	R1 O-AZ120	BS120 AFLAS O RING	1	02
003	R1 2SX0804A-002	BCURC 1.000 BELLOW CARB HEAD ASSY (SHS)	1	05
004	R1 2SX0821	BCURC 1.000 BELLOW GRAPHOIL DRIVE END	1	01
005	R1 SB0806-25	CURC 25 MM SiC STATIONARY	1	06
006	R1 O-AZ219	BS219 AFLAS O RING	1	07
007	R1 SP0807-25/01	CSM 25 MM SPACER RING	1	15
008	R1 SB0808-25/01	CURC 25 MM GLAND	1	08
009	R1 SB0810/01	CURC 1.000 CLAMP RING	1	09
010	R2 YSKS03	M6x8 SOCKET SET SCREWS (A4)	3	10
011	R2 YGNA/C025-N	25mm CURC GASKET 2.312 x 1.812	1	14
012	R2 YSKS08	M6 x 8 A4 S/STEEL ANTI TAMPER	2	13
013	R2 YCUR02	CURC CLIPS (ZINC)	3	12
014	R2 YSKS05-N	M6x8 CURC CAP HEAD SCREWS	3	11
015	R2 YSKS237	M3 x 8 HEX HEAD SCREW (A4)	4	04



18. MAR. 2002 16:00

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P. 41

FIGURE 9

## Assembly Trial Kitting Enquiry

Date : 06/02/02 2:00:06

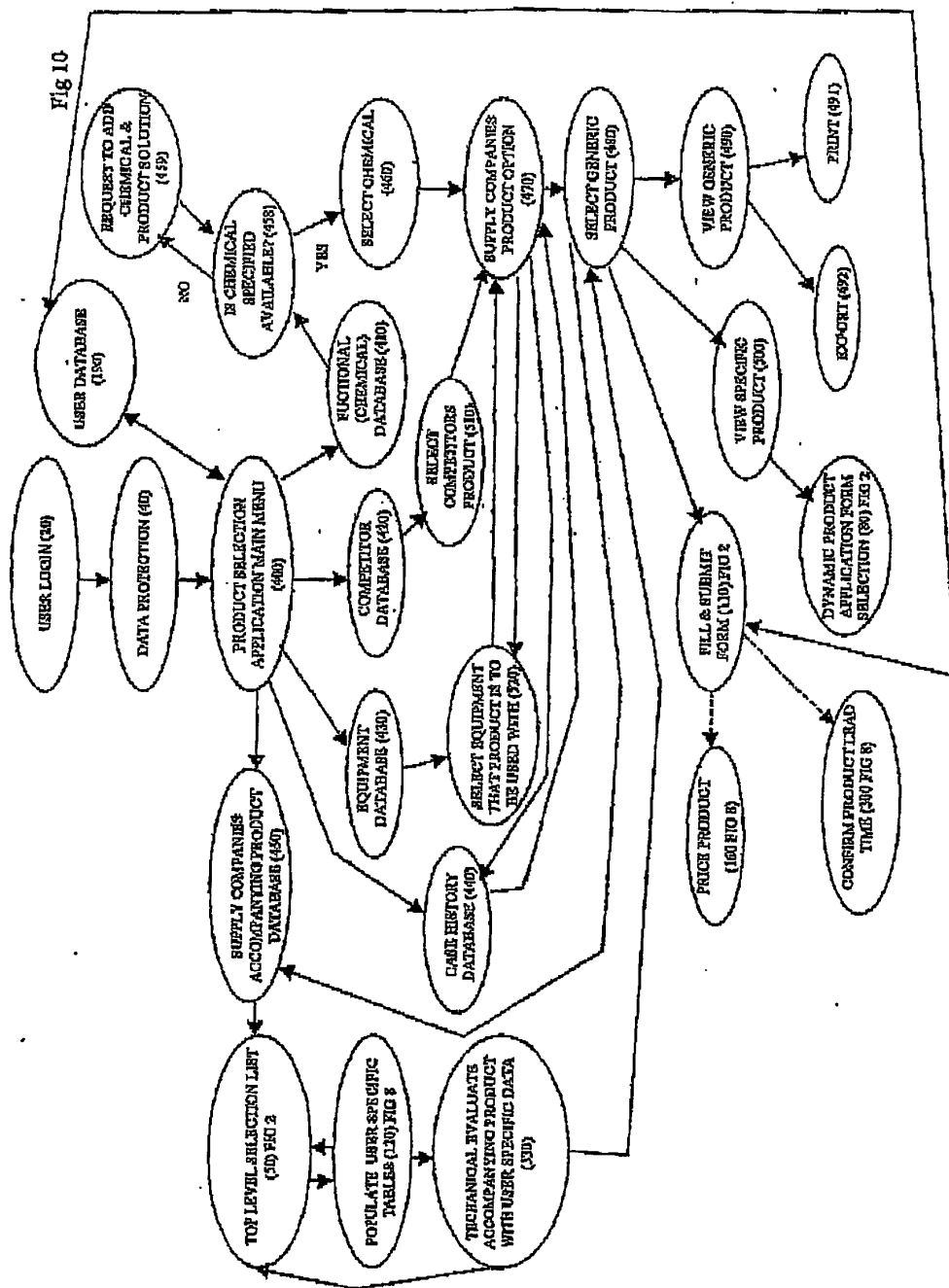
Assembly code : R9 BHCS--01A002300-I08-  
 Description : 1.000 BQFD CB/SIC (SES) -AZ/GR/AZ-  
 Alpha code : BQFD 1.000  
 Qty required : 5  
 Units : EACH (251)  
 Phantom? : N  
 Drawing number :  
 Revision number : 0001 Date : 06/02/02  
 Reject percent : 0.00

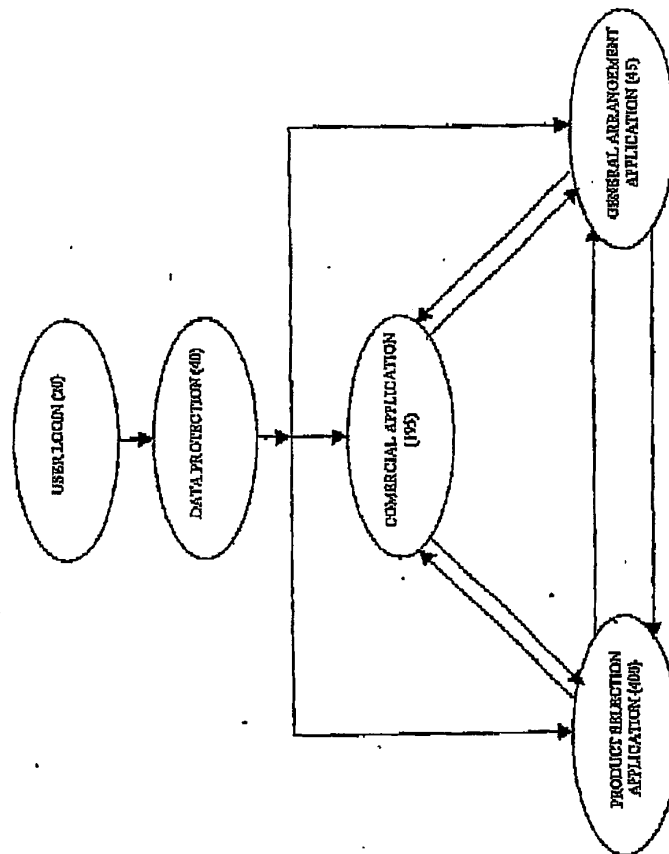
Run as for : 06/02/02

2nd Dra  
 2nd Rev  
 Security

Stat	Expires	Component code	Required	Shortage	Free stock
		R1 2SX0804A-002	5	0	8
		R1 2SX0821	5	0	47
		R1 2SX0823/01	5	2	3
		R1 O-AZ120	5	0	61
		R1 O-AZ219	5	0	43
		R1 SB0806-25	5	0	115
		R1 SB0808-25/01	5	0	33
		R1 SB0810/01	5	0	120
		R1 SP0807-25/01	5	0	40
		R2 YCUR02	15	0	30295
		R2 YGNA/CO25-N	5	0	279
		R2 YSKS03	15	0	10183
		R2 YSKS05-N	15	0	19839
		R2 YSKS08	10	0	17243
		R2 YSKS237	20	0	976

11





## II. ਗੀਤ

## PRODUCT SELECTION

Page 1 of 30

Customer service is one of the key elements, which differentiates companies competing in the same industrial sectors.

5

Companies, which embrace and develop applications which help them improve their service levels to their customers, are more likely to grow or survive in a highly competitive world.

10

Many companies sell products with varying degrees of complexity.

15

Products offered, range from computers to mechanical assemblies such as rotating pumps. Practically every man-made item that we see, use or touch is a product manufactured, distributed or offered by a company somewhere in the world.

20

A lot of products have multiple options or configurations. The multiple options could be products with different colours, shapes, sizes, or specifications etc.

25

Take a computer for example. A typical computer can be assembled in a variety of configurations. Each configuration is offered to suit a particular need. The need may be cost driven or technical specification driven.

30

For the purpose of this application, products with multiple configuration options are termed as "complex assemblies".

Increasingly, customers are promoting their products over the internet. The internet allows companies to promote their products to customers in all parts of the world, working in differing time zones.

Companies can offer customer service by allowing customers to make product selection decisions based on what product specifications options are offered, at what price and in what time frame (lead-time) they can be supplied.

5

A further benefit may be provided if the customer can identify what the product will physically look like including the dimensions of the product.

10 Companies, which offer such a "product selection" service, particularly for complex assemblies, over a common communication system, such as the internet or any similar information technology based network, may attain a competitive advantage.

15 In certain circumstances, the customer may not know exactly what he needs for an application or particular problem. In a chemical processing industry, a customer, for example a mechanical engineer, may need a sealing device to prevent his equipment from leaking. Such a sealing device may need to operate to the customers exacting  
20 parameters. These parameters include the chemical being sealed, its temperature and its pressure.

In such applications, the customer knows his application, but is unsure what sealing product he will need and which materials of  
25 construction should be used.

It is deemed considerably advantageous if the customer can identify what product he needs, then determine its price and lead-time, its physical dimensions and appearance all from a remote location or  
30 time zone. Furthermore, without the need for human intervention, it is advantageous if the customer is then allowed to place an order, for his selected product, direct into the supplying companies business system.



It will be apparent to an experienced reader, that if a supply company offers such a service, particularly for a complex product, then it will indeed gain a competitive advantage selling and promoting its products.

5

The following integrated application / invention will be further discussed in detail, with respect to;

10

- the generation of a general assembly or general arrangement drawing of the product, showing its physical size and shape,
- the price and availability of the product selected by the customer,
- ordering the product direct into the supply companies business system.
- the selection of a product for a specific customer duty or request,

15

General Arrangement Application

Most technical products, particularly in the engineering sector, are tendered, designed and/or distributed with a General Arrangement drawing of the product.

20

Said General Arrangement drawings are particularly important to convey what is being offered or sold.

25

General Arrangement drawings often contain information pertinent to the product being offered. Such information may include at least one view of the product, dimensional information of the product and/or a parts list, particularly relevant for products with more than one component in their assembly.

30

Further information presented on a general arrangement drawing may include information specific to a customer or application. The industry term for such a general arrangement is a certified drawing.

Practically every industry and sector creates product drawings. By way of example only, in Civil Engineering, general arrangement drawings are created for structures such as bridges, bus shelters or even traffic lights.

5

Architectural engineering uses general arrangement drawings to illustrate building constructions, office layouts or furniture assembly.

Electrical engineering uses general arrangement drawings to illustrate electrical circuits, wiring diagrams or electrical mechanical assemblies such as printers, computers, televisions, plugs or radios.

10

Automotive engineering uses general arrangement drawings to illustrate vehicle design, engine assembly or a fuel distribution system.

15

Mechanical engineering is a further example of such a sector, which uses general arrangement drawings to illustrate products. Practically every product from a piece of mechanical handling equipment such as a forklift, to an item of rotating equipment such as a pump, has an arrangement drawing.

20

Rotating equipment is used to process a variety of liquids in practically every industrial sector from Chemical processing to the Pulp and Paper Industry.

25

There are many parts in a piece of rotating equipment. One such part is a mechanical seal. Mechanical seals are engineered products; often comprising of a number of components assembled in a particular manner. Since mechanical seals are used to seal a variety of chemicals and process fluids, there are many combinations of materials and components that are used in any given generic assembly.

30

Not dissimilar to most products with multiple variations and combinations of components, creating individual mechanical seal certified general arrangement drawings is a time consuming and an expensive exercise.

5

For example, if one takes any product range with say fifty product sizes in said range. Each product is offered in one hundred materials combinations and ten colours. The number of individual certified general arrangements would be fifty thousand. Then assume an  
10 average company has thirty product ranges each requiring fifty thousand drawings each. It is not practical for any company to create said number of drawings. The number of drawings further increases when the customer requires the general arrangement drawing producing with their respective name and application details. For two  
15 hundred customers each with fifty applications each, using the example above, a company would have to create over a billion complex assembly drawings.

20

By conventional means, depending on the complexity of the product or its assembly, each assembly drawing can take several hours to produce.

25

A general arrangement application which can produce a certified drawing within a fraction of this time is deemed to be particularly advantageous.

30

It is deemed to be further advantageous, if said general arrangement application is database driven and accessible to any user at any location / country.

The present invention may be used as a stand-alone application or accessed over the internet to more than one user.

The present invention allows any one user to create a certified general arrangement of a product, within minutes of entering their specific product configuration requirements.

5 Furthermore, the invention may automatically create a unique reference code configured to the product requested. This unique reference code may be subsequently used to order the product required. Furthermore, if so desired, this unique product reference code may be directly sent into a suitable application, whether part of  
10 the same application or an application, which communicates with, said primary application.

An example of such, is where the product reference code is imported into a companies business system. Such a code could then be used  
15 to trigger an assembly build request or product tender / estimation.

It will be obvious to the experienced reader that once a unique and traceable product reference code is created, particularly electronically, said reference might be read or exported into any  
20 suitable application for further analysis or use. The potential applications where this invention may be applied are possibly endless.

In particular this functionality makes automatic product ordering to a  
25 certified specification, a possible option. Furthermore the reference code could be used to trigger a request for product manufacture or a sales order despatch. Such an automatic process would require minimal or zero human invention.

30 An experienced reader will therefore note that such an application has major business advantages in that business-operating costs could be reduced and / or customer service levels could be increased.

The invention is further described with the aid of the following drawings.

*Figure 1*, illustrates a typical product assembly, such as a mechanical seal, comprising of more than one possible assembly configurations.

*Figure 2*, illustrates a logic tree for the general arrangement application.

*Figure 3*, illustrates a general arrangement template drawing for a product with more than one possible assembly configuration.

*Figure 4*, corresponds to *Figure 3* and illustrates a certified general arrangement, completed from a template, for a product with more than one possible assembly configuration.

By way of example only, *Figure 5*, illustrates a certified general arrangement for another product with multiple assembly configurations.

For simplicity, the general arrangement application will be further explained referring to product with more than one possible variable. As an example only, the product used for this purpose will be a mechanical seal typically used to seal an item of rotating equipment such as a process pump.

*Figure-1* illustrates an isometric view of a mechanical seal (10). Said mechanical seal (10) is assembled using a number of individual components. Such components include a sleeve (11), sleeve elastomer (12), rotary seal face (13), stationary seal face (14), gland insert (15), gland (16) and clamp ring (17). The clamp ring (17) contains setscrews (18). An experienced reader will appreciate that there are a number of further components not shown.

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As mechanical seals (10) are used in a wide variety of applications, a generic design and respective components may be offered in a wide variety of material combinations. Each material offers certain advantages in a given application. For example, the sleeve (11) may be offered in three materials, the sleeve elastomer (12) may be offered in seven materials, the rotary (13) and stationary (14) faces may be offered in five materials each etc.

Certain customers, particularly engineers, require certified general arrangement drawings with quotation tenders and / or final delivery of the product. A certified drawing should generally only illustrate the particular material combinations requested by the customer. Typically, generic general arrangement drawings, which show multiple options, are not specific enough and therefore are not normally accepted by a customer.

This creates a huge problem for a company with many product ranges, each with multiple configurations.

*Figure-2*, of the invention shows a logic tree of a general arrangement application which enables a user to create certified drawings.

From *Figure-2*, a user logs on (20) to the application (30). When accepted through an appropriate data protection review (40), typically a password check / authorisation, the user enters the general arrangement application (45) and selects a generic option from a top-level selection list (50).

Should the required generic option not be available from the top-level selection list (50), the user may elect to send a request (60) for the missing option to be added.

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Once a user selects a generic top-level option (50), the request is sent to a database (70), which contains data relating to the top-level item selection list (50).

5 The request, via the database (70) then triggers a dynamic file (80), for example a Cold Fusion Mark-up Language / CFM file. This dynamic file (80) relates to the top-level item (50) selected.

10 The dynamic file (80) presents a relevant form (90), which is configured to select an appropriate general arrangement template (100).

15 An example of a general arrangement template (100) is shown in Figure-3. Said template (100) contains the generic illustration of the product, with the variable options omitted. By way of example only, said template (100) is stored as a Form Document Format (FDF) or a Portable Document Format (PDF) file.

20 From Figure-2, the user completes the form (90) with the product configuration requested. Form (90) will contain either pre-defined fields or non-defined fields, or a combination of both pre-defined or non-defined fields.

25 Preferably the form (90) contains pre-defined option selection boxes, prompting the user to select a product configuration from a finite option list. However certain customer specific fields may be required.

30 These are typically not product related, however are part of the drawing certification format, required by the customer. These are non-defined fields.

From Figure-3, the pre-defined product configuration options (101) typically appear in the part list (102) on template (100). Non-defined,

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customer specific fields (103) typically appear in the customer certification title block (104) on template (100).

5 Referring back to *Figure-2*. Once the form (90) is completed, to the extent the user is able to complete the form, the user submits (110) the data. The application then populates the requested user data into a user specific table (120). This user specific table (120) may be stored locally or centrally on a network. The user specific table (120) allows the user, at a later stage, to browse through the general  
10 arrangements that they have specifically created.

Upon completion of writing the information to the user specific table (120), the application then populates the selected general arrangement template (*Figure-3*, 100) with the user specific  
15 information. This is represented in *Figure-2* by populate template stage (130).

From *Figure 3*, the application then further populates the template (*Figure-3*, 100) with a relevant product reference code (105). The  
20 product reference code (105) is created by comparing each user-defined option against a pre-defined data table.

*Figure-4* illustrates a user completed certified general arrangement drawing containing both requested finite product data (106) and  
25 infinite customer data (107). *Figure-4* also illustrates at least one, generated product or order reference code (108) and optional assembly reference code (109).

Furthermore, from *Figure-4*, a skilled person will also note that a  
30 unique suffix code (111) has been attached to the drawing number. This differentiates identical generic product drawings with contain different assembly configuration information. This is deemed to be advantageous when, for example, an engineering company is



required to be quality assured by an external approval body such as Lloyds.

5 It should be further noted from *Figure-4*, that the physical dimensions (112) of the product assembly have also been entered onto the certified customer product drawing. This shows the exact dimensions of the product requested by the user. The presentation of said exact dimensions is deemed to be advantageous compared to the conventional tabular approach. In the conventional approach, a  
10 typical user has to carefully and accurately read data in complex tables. This can lead to errors and misunderstandings.

The specific information (106) contained in Figure 4, together with the customer information (107) and representation of product, creates a general arrangement drawing, which is deemed to be certified.

15 Referring back to *Figure-2*. When the customer certified drawing is created at the data population stage (130), the user may elect to view (140), print and / or export the general arrangement. Furthermore, the user may elect to store (150) the certified drawing for future use or  
20 electronic distribution.

An important feature of the invention is that, unless the user specifically requests to store (150) the certified drawing, the application will only retain the user created raw data. The application  
25 could be easily adapted to retain the user created certified drawing, however it is deemed particularly advantageous to only save the raw data as this considerably reduces the size of the electronic file.

30 An experienced person will appreciate that a typical group of users may create fifty thousand certified drawings in a small time period. If each certified drawing contains the generic template, of the file size 70,000 Bytes and user raw data size 100 Bytes, the electronic

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storage space required would be over 3.5 Giga Bytes (35,000,000,000 Bytes). This would be very difficult to manage over any realistic time period.

5 In general the larger the individual file and the more cluttered the electronic storage space, the slower the application. This is particularly disadvantageous when operating a multi-user version of the application from a remote site accessed by a low-technology data transfer link.

10 One can therefore see a considerable advantage if only the user raw data (100 Bytes) is electronically stored and the application retrieves a common general arrangement template (100) each and every time the user wishes to view the user created certified drawing.

15 Referring back to *Figure-2*. At the "populate user table" stage (120), a further feature of the invention is that the user may elect to retrieve a price of the product from a product price list database (160).

20 Should the user request need to be further processed, the user may submit the user defined information and specific product order reference code (*Figure-4*, 108) to a companies business system (170). Considerable corporate advantages may be then realised, as human intervention can be reduced / eliminated from the order  
25 execution process.

Referring back to *Figure-2*. Once the user table (120) is populated with the user specific information, the user information is recorded (180) and stored in a database (190) for future retrieval / use.

30

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It is considered self evident to an experienced reader that the invention may be employed for any type of product whether an individual component, a sub-assembly or full assembly. A further example of a different product is shown in Figure 5.

5

Furthermore, the invention may be used as a single user, stand-alone application, or preferably, used as a multi-user, networked or server based application.

10

While the application is not limited to the generation of mechanical seal drawings, it is deemed particularly advantageous since a typical mechanical seal has many assembly configurations.

15

At the time of issuing this application, preferably the general arrangement application is created in a cold fusion programming language, however equally, it may be created in any programming language including, but not limited to, Java script, Visual Basic, Java, HTML and Active Sever Pages (ASP). With advances in technology, new programming software will be developed. An experienced reader

20

will note that the concept of the invention may be presented using any suitable programming means.

25

The illustrations (Figures 3 to 5) show two-dimensional representations of products. It should be noted that the invention could be used in a similar manner to what has be described above, however with three dimensional representations, video and / or animated representations of products.

30

In the multi-user mode, a skilled person will note that the invention enables a user to create a product reference code. Said product reference code, particular to their requested product, may then be used in any application where it can be of further benefit. This has obvious commercial advantages.

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One particular use of the product reference code, it to confirm the availability or lead-time of the product selected. This is described in the commercial application below.

5     Commercial application

The commercial application will be further described with reference to the following drawings;

10     Figure 6, illustrates an example of a generic Bill of material template sheet, for one particular product in one particular size.

Figure 7, corresponds to Figure 6, and illustrates an example of a customer configured Bill of material sheet, for one particular product in one particular size.

15     Figure 8, illustrates a logic tree for the product commercial application, detailing product availability and price functions.

20     Figure 9, corresponds to Figure 7, and illustrates an example of a customer configured Trial Kit sheet, for one particular product in one particular size.

25     Complex assemblies typically have many components which are used in their assembly. Each of the components, may also be used in a variety of other assembly configurations. Such components, which can be used in a variety of configurations, are termed modular.

30     Complex assemblies can have many hundreds of thousands of configurations. As previously discussed, an example of a complex assembly is a mechanical seal. If a mechanical seal is offered in fifty seal sizes, each with sixteen seal face combinations and fifty elastomer combinations, there will be 40,000 different assembly configurations.

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Typically, each of the 40,000 assembly configurations require a bill of material. A bill of material is a detailed parts list showing a full breakdown of all the components which make up the complex assembly.

5

Each individual component may or may not be inventoried at any one moment in time.

10

In order for a customer to determine the availability of their selected product, a detailed bill of material of that product must be firstly created. This bill of material is configured to the customer's request. Bills of materials generally reside in dynamic application such as a supply company's business system.

15

Bills of material generally show more detail than an equivalent parts list in a drawing application.

20

Over and above the typical drawing parts list, Bills of material typically include component stock code details, the location or warehouse where component resides in the business system, the packing and boxing requirements, the documentation needed to accompany the product assembly etc.

25

An experienced person will appreciate that parts lists in drawings are conventionally static, however, if deemed appropriate, such parts lists also may be linked to a supply company business system.

30

Preferably, dynamic Bills of material which are linked to the company's business system are employed.

It will be noted that it is not feasible for any company to create 40,000 Bill of Materials covering all the possible configurations of a single product range. This is increasingly impractical if one considers that a

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5 typical company may have many product ranges. For example, a company which supplies mechanical seals may have 30 product ranges. This generates a requirement to create over 1.2 million bills of material. If each bill of material is not created, then there is a possibility that the customer will not be able to confirm the availability of his selected product, via the application which is linked to the supply company's business system.

The invention addresses this issue in one of two ways.

10 The invention firstly determines if the bill of materials already exists in the companies business system.

15 If the customer selects a product where the bill of material already exists in the companies business system, the invention confirms the availability of the complex assembly by identifying if each component, pertaining to the complex assembly, is inventoried. This will be discussed later with reference to Figure 9.

20 If the customer selects a product where the bill of material does not already exist in the companies business system; the invention automatically creates a new bill of material.

25 From Figure 8 – once again the user logs on passes through the data protection (40) check and then selects to enter the commercial application (195).

The commercial application will allow the user to browse the user database (190), and select previously defined product assembly configurations.

30 If the application is used in its fully integrated mode, the user database (190) shares the same information defined in enter the general arrangement application (30) defined in Figure 2, or the

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product selection database (400) defined later in Figure 10.

- 5 Referring back to Figure 8. If the user creates a new entry, he may do so from selecting a product from the Top level selection list (50), submit the form (110) and populate the user specific tables (120).

The application then confirms whether the user requested BOM exists (125). If the user requested BOM does not exist, the application confirms if a BOM template exists (200).

- 10 The application creates the customer specific Bill of Material using a suitable selected (202) Bill of material template.

- 15 If no (200) template exists the application sends a request (201) to the supply company for a template to be added. In general if the supply company is offering a product then it will ensure a template exists for that product. An example of such template is shown in Figure-6.

- 20 Figure-6 is an example of a mechanical seal Bill of material template. Each product range incorporating, for example, fifty product sizes, has fifty bills of material templates created. The template contains the components which are not variables / which do not change with the product configuration.

- 25 Figure-6 is an example of a product template, for a generic product, which is termed a BQFD. The selected product size is 1.000".

- 30 From Figure-6, the Bill of material template shows the generic components which relate to the customers selected product type and size. As the customer has completed and submitted his request to a user specific table (120) from Figure-8, this configured data is used to complete a copy of the Bill of material template. This configured Bill of

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material is shown in *Figure-7*.

5 It will be noted from *Figure-7*, that the assembly reference code (210) has been populated in the configured Bill of material. This assembly reference code (210) is identical to the assembly reference code (109) in *Figure-4*.

*Figure-8* illustrates the logic tree for the Bill of material process.

10 From *Figure-8*, when the customer-configured bill of material is complete (205), the user enters the quantity of products (230) he requires. The user then has the option to confirm the product lead-time (300) via an "assembly trial kit" (220). The components, which are not inventoried, are appropriately flagged.

15 By way of example only, *Figure-9* illustrates an assembly trial kit sheet, showing the components which are not inventoried. These components are shown in the "shortage column" (240). For the example, the customer will note that component code 2SX0823/01  
20 has a shortage (250) of two components. This shows that the customer can only have three products from inventory, not five that he requested (251).

25 Referring back to *Figure-8*. The customer then has the option to confirm the lead-time for the outstanding products. The invention then reviews the components which are short (310), compares the component type against a lead time database (320), and informs the customer with an anticipated despatch date (330).

30 If the product lead-time is unacceptable, the invention allows the user to review alternate options (331). Typically such alternate options cover alternate materials of construction as well as alternate products. The user is then allowed to trial test (220) the alternative



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product option selected.

5 Built in rules enable the user to select alternatives based on suggestions made by the system. Alternate materials of construction will be offered on the basis that the specification of the product is acceptable to the application. Alternate products will be offered on the basis that the dimensional size of the product and the materials of construction are acceptable to the application.

10 If the lead time (330) is acceptable the user can either place an order (350) or return to the user database (190).

15 An experienced reader will note that the invention when used with a global communication tool such as the internet allows a user to make real time product availability decisions without the need for the supply company involvement. Such a user could be sited anywhere in the world, in any time zone.

20 In certain situations, this invention is particularly advantageous as it enables the supply company to provide valuable customer service. An example of this added value is when a chemical processing company has a mechanical seal failure at 3.00am GMT. An customer can then select a product from a supply company, check its availability, check its price and order the mechanical seal within minutes of entering the application / invention.

25 From Figure 8, it will be noted that at the trail kit (220) stage, the customer may also request to price (160) his configured product. The product assembly code (Figure 4, (109)), created by the customer is cross referenced to a product pricing database (Figure 8, (161)). The customer is then given the product price (160) by any deliverable means (162) including electronically, visually, or via a printout.

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Once again, if the product price is unacceptable, the invention allows the user to review alternate options, as discussed earlier.

- 5 It will be further noted from *Figure-8*, that the user can elect to send the product order request (350) to the supply company business system (170). This order request (350) will typically be processed through a customer account verification database (360). If the customer is new to the supply company, a request new account application form (370) is sent to the customer. The user completes an application form and returns it back to the verification process (360).
- 10

Once the customer account is verified, the order request (350) is sent to the supply company's business system (170) for further processing.

- 15 Once the order enters the supply companies business system, the customer order may be directed straight to the assembly build team, the dispatch area, or any other part of the business which requires the order information.

20 *Product Selection application*

The product selection application will be further described with reference to the following drawings;

*Figure 10*, illustrates a logic tree for the product selection application.

- 25 *Figure 11*, illustrates a logic tree for the holistic application showing the integration between the product selection application, general arrangement application and the commercial application.

- 30 An integral part of the application is the functionality that enables a user to specify their product requirement in a complex application.

The experienced reader will recognise the difficulty in getting to a

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product specification based on many variables.

5 By way of example only, in many engineering applications, products must be specified with regard to pressures, temperatures, chemical compatibility's, dimensions, competitors equivalents, equipment that the product must be fitted too etc.

10 By drawing on stored data in a number of data areas, simple rule sets can be used to specify complex assembly products for a given application. This is particularly advantageous to an organisation as it removes the need for highly trained members of staff in answering simple specification questions for customers.

15 Conventionally, each product specification process may take several hours without such knowledge based management systems.

20 From *Figure-10*, the user logs on (20) the to application and is processed through the data protection field (40), as described previously.

The user is then presented with the product selection main menu (400). From said main menu, the user can elect to enter a number of databases, depending on the information he has.

25 For example, when selecting a product from a supply company, the user may wish to choose a product by;

- 30
- Entering the equipment where the product is to be installed (430)
  - Entering competitor equivalent products (420)
  - Entering the information or environment where the product is to function or operate (410)
  - Browsing case histories where products have been previously supplied (440).

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In addition, many products work in conjunction with other accompanying or "sister" products. Said accompanying products often compliment the former product's performance.

5 An example of this is a computer. A computer base unit can have multiple accompanying products such as a monitor or keyboard. Different monitor specifications can improve the computer base unit's performance to a greater or lesser degree. The monitor and the computer base unit have therefore an interdependent relationship.

10 It is therefore considered self-explanatory, that a user may select a product with due consideration to an accompanying product. This facility is therefore a further option of the product selection application and shown in Figure 10, (450).

15 Given this functionality, an experienced reader will note that the aforementioned product selection methods are examples only. Many additional or different product selection methods can be applied to the application depending on the product being offered.

20 Therefore from Figure-10, a user can enter the functional database (410). As an example only, this database contains multiple chemical descriptions. In the chemical processing industry, many thousands of different chemicals are processed. It is critical that products with the correct materials of construction are selected for such applications.

25 Therefore the user in the aforementioned example, browses through the chemical database (410) until he selects (460) the chemical he requires his product to function with.

30 Where an application cannot be specified from the existing knowledge within the system, the supply company's in-house team could then produce a specification and importantly, add that solution

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and knowledge into the application.

From *Figure 10*, if the chemical required is not present, (458) in the chemical database (410), the user can request the chemical and the appropriate product solution/offering, to be added (459).

This functionality suggests that any single application, even in very complex environments, need only be solved once. The experienced reader will again recognise the value of this process.

From *Figure 10*, once the user has selected the chemical (480), the application offers the user the preferred product option (470). It also offers alternate product offerings, which are second and third choice solutions.

Once the user selects the generic product (480) offered, he has the option to view (490), export (492) or print (491) the generic product. Equally, since the invention can be run as an integrated application, the user may complete the dynamic product application selection form (80) outlined in *Figure 2*. This turns the "generic" product offering to a specific user product offering, typically including product size.

From the dynamic application selection form (80), the user may then create a general arrangement drawing, as previously described.

Returning to the main menu (400) in *Figure 10*, the user can elect to browse the competitor database (420). Often, users wish to replace products that they have previously used. The user may be aware of the competitor's product but may be unaware of the direct equivalent product from the supply company.

From *Figure 10*. In the integrated mode, the user may also fill and submit form (110) and confirm commercial information such as

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product price (160) and product lead time (300).

5 Once a competitor's product is selected (510), the user has the option to review the supply company's equivalent (470). This application functionality is extremely valuable given that the supply company may be a new player in an established industry.

10 Equally, the user has the option from the main menu (400), to review the equipment database (430). This equipment database (430) contains the details of the equipment where the supply company's product may be fitted.

15 Once again, the user may know the equipment details but be unaware of which products, from the supply company, are available for his piece of equipment. After selecting the appropriate equipment details (520), the user is offered a finite list of products, which may be applied to his equipment.

20 Furthermore, from the main menu (400), or from a number of other related fields such as the supply company's product option menu (470), the case history database (440) may be browsed. This case history database (440) allows the user to view previous examples of products working;

- 25
- With different types of equipment,
  - In place of competitors products,
  - in functional or operational environments, etc.

30 This functionality offers the user / customer an extra dimension of customer service and confidence to switch to the supply companies products.

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As previously discussed many products work in conjunction with one or more accompanying products. Such accompanying products may be from the supply companies accompanying product range, or from a different supply company.

5

It should be noted that the invention has the ability to link to more than one accompanying product database, whether part of the supply company, or not.

10

From Figure 10, products may be selected from the accompanying product database (450), by any of the previously described product selection methods.

15

Where product performance is dependent on the selection of an accompanying product, an experienced reader will note the inter-dependant, re-iterative selection functionality of the invention.

20

By example only, this inter-dependant relationship is illustrated by the feedback loops between the technical evaluation of an accompanying product stage (530), select generic product stage (480), and the accompanying product database (450).

25

As shown in *Figure-10*, it will be obvious to the experienced reader that price, availability and general assembly details of the accompanying product can be established since the invention may be run as a totally integrated package.

30

Equally, an experienced reader will note that any of the aforementioned applications;

- the general arrangement application,
- the commercial application, and / or
- the product selection application,

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may be run as an individual application in their own right, or as integrated applications.

5 It will be noted, that the invention, particularly the integration of all three applications over a suitable communication network, covering more than one user, allows the supply company considerable customer service advantages.

10 The fully integrated aspect of the invention, particularly, but not limited too, the three applications, is shown in *Figure-11*.



## CLAIMS

1. A computerised product ordering system comprising first software for an activity comprising selecting a product for a particular application, second software  
5 for an activity comprising preparing a certified drawing of said product and third software for an activity comprising determining the availability and pricing of said product, and means whereby a user may navigate within the system between said first, second and third software in order to carry out a selected activity.
- 10 2. A system according to Claim 1, wherein said first software comprises means for accessing a database holding details of products suitable for applications defined by reference to a plurality of parameters, means enabling entry of at least one parameter relevant to a particular application in order to identify a generic product  
15 appropriate to that application and means to allow addition of details of the generic product to define said specific product.
3. A system according to Claim 2, wherein said first software includes at least one of an equipment database, an operational database, a competitor database, an accompanying product database and a case history database.
- 20 4. A system according to Claim 2 or Claim 3, wherein said first software comprises means for integrating the selection process of more than one product, including accompanying products, thereby facilitating reiterative selection of either one or all products, and for determining whether the product origin is of the supply  
25 company or that of a different supply company.
5. A system according to any of Claims 2 to 4, wherein said first software creates at least one specific product reference code relating to the user defined information.

30

6. A system according to Claim 5, wherein said reference code may subsequently be used in a secondary application such as a business system, or used in a further stage of the same application.

5 7. A system according to any of the preceding claims, wherein said first software communicates directly with said second software, whereby said first and second software share the user specific information created.

10 8. A system according to any of the preceding claims, wherein said second software comprises means for presenting a top level selection list from which a generic option can be selected, means for presenting a form to enable a general arrangement template to be selected, means allowing user-defined data to be entered into a selected general arrangement template, means for creating a product reference code by comparing user-defined data with a pre-defined data table.

15 9. A system according to Claim 8, wherein means are provided for creating at least one specific product reference code relating to the user-defined data.

20 10. A system according to Claim 9, wherein said reference code may subsequently be used in a secondary application such as a business system, or used in a further stage of the same general arrangement application.

25 11. A system according to any of Claims 8 to 10, wherein the system further includes means for populating said template with material information and dimensional information.

30 12. A system according to Claim 11, wherein the product is a mechanical seal and the populating means automatically populates a mechanical seal template general arrangement drawing with, at least, material dimensional and user specific information.

13. A system according to any of any of the preceding claims, wherein said third software comprises means for presenting or creating a bill of material template for a desired product configuration, said template holding details of non-variable components, means for adding to the template details of variable components, means  
5 for submitting the desired quantity of the product and means for determining an estimated despatch date for products not immediately available due to a shortage of any component.

14. A system according to Claim 13, wherein said third software integrates the  
10 selection process of more than one product, including accompanying products, thereby facilitating reiterative selection of either or all products, and whether the product origin is of the supply company or that of a different supply company.

15. A system according to Claim 13 or Claim 14, wherein said third software  
15 creates at least one specific product reference code relating to the other user-defined information.

16. A system according to Claim 15, wherein said third software creates at least one specific product reference code relating to user defined information, said  
20 reference code being subsequently used in a secondary application such as a business system, product selection application, or used in a further stage of the same application.

17. A system according to any of Claims 13 to 16, wherein said third software  
25 communicates directly with said second software and shares the user specific information created.

18. A system according to any of the preceding claims, wherein said first, second  
and third software is created in an internet efficient programming language.

30

19. A system according to Claim 18, wherein said internet efficient programming language is Cold Fusion, Java Script, Visual Basic, Java, HTML or Active Sever Pages or a combination of any aforementioned languages.

5 20. A system according to Claim 1 and substantially as herein described.

21. A computerised product ordering system, substantially as described herein with reference to one or more of the accompanying drawings.

10 22. A product ordering method comprising accessing a system according to any of the preceding claims and carrying out one or more of said activities by the use of said first, second and/or third software.

15 F100046 claims

